IN THE CLAIMS:

1. (Original) A noise extraction method comprising the steps of:
providing an environmental input which includes a noise indicia,
selectively modifying the environmental input in accordance with an algorithm based on at least one of a group including time response, amplitude of response, and error correction, and
generating an output signal accordingly.

2. (Original) The noise extraction method of claim 1 wherein the modifying step includes an algorithm based on time response, and the time response algorithm includes delaying responding to a change in the noise indicia above a threshold.

3. (Original) The noise extraction method of claim 1 wherein the modifying step includes an algorithm based on time response, and the time response algorithm includes providing a response which is relatively slow in comparison to the change in noise indicia.

4. (Original) The noise extraction method of claim 2 wherein the time response algorithm further includes converging on a noise level corresponding to the noise indicia above the threshold following the delayed response.

5. (Original) The noise extraction method of claim 4 wherein the converging step includes one of a group comprising: a nonlinear response, an exponential response, and a logarithmic response.

6. (Original) The noise extraction method of claim 1 wherein the modifying step includes an algorithm based on amplitude of response, and the amplitude of response algorithm includes scaling of the environmental input.

7. (Original) The noise extraction method of claim 1 wherein the modifying step includes an algorithm based on amplitude of response, and the amplitude of response algorithm includes scaling of the output signal.

8. (Original) The noise extraction method of claim 6 wherein the scaling corresponds to a

change in user input.

9. (Original) The noise extraction method of claim 7 wherein the scaling corresponds to a change in user input.

10. (Original) The noise extraction method of claim 6 wherein the scaling includes linear multiplication or logarithmic addition.

11. (Original) The noise extraction method of claim 7 wherein the scaling includes linear multiplication or logarithmic addition.

12. (Original) The noise extraction method of claim 1 wherein the environmental input comprises a plurality of environmental sub-inputs.

13. (Original) The noise extraction method of claim 1 wherein the environmental input is a digital signal.

14. (Original) The noise extraction method of claim 1 wherein the environmental input is an analog signal.

15. (Original) The noise extraction method of claim 1 wherein the step of selectively modifying the environmental input includes multiple instances of modifying in accordance with the selected algorithm.

16. (Original) The noise extraction method of claim 1 wherein the step of selectively modifying the environmental input includes modifying the environmental input in accordance with a plurality of such algorithms, with at least some of such algorithms based on a different choice within the group.

17. (Original) The noise extraction method of claim 15 further including the step of combining at least some of the outputs of the multiple instances.

18. (Original) The noise extraction method of claim 16 further including the step of combining at least some of the outputs of the plurality of such algorithms.

19. (Original) The noise extraction method of claim 1 wherein the output signal includes a plurality of signals.

20. (Original) The noise extraction method of claim 1 further including providing a reference signal, determining the difference between the environmental input and the reference signal to generate a negative feedback signal, and modifying at least one of the environmental input and the reference signal in accordance therewith.

21. (Original) A method for correcting for small noise fluctuations including the steps of
providing at least one environmental input having a noise indicia with a small noise fluctuation amplitude,
providing at least one reference input,
determining the difference between the environmental input and the reference input to generate a feedback signal,
converting the feedback signal to a gain offset having a predetermined maximum and minimum selected to correct for the small noise fluctuation amplitude.

22. (Original) The method of claim 21 further including the step of rectifying and envelope detecting the environmental input and the reference input prior to the step of determining the difference.

23. (Original) The method of claim 21 further including the step of converting the environmental input and the reference input by the root-mean-square method prior to the step of determining the difference.

24. (Original) The method of claim 21 further including the step of converting the environmental input and the reference input by a Fourier transform prior to the step of determining the difference.

25. (Original) A noise extraction method comprising the steps of:
providing a reference signal,
providing an environmental input which includes a noise indicia with a small noise fluctuation amplitude,

determining the difference between the environmental input and the reference signal to generate a negative feedback signal,

modifying one signal of a group comprising the environmental input and the reference signal to minimize the difference to correct for the small noise fluctuation amplitude, and

generating a modified output signal in accordance therewith.

26. (Original) The noise extraction method of claim 25 further including the steps of

selecting as an unmodified output signal the one signal of the group modified in the modifying step,

determining the difference between the unmodified output signal and the modified output signal,

establishing a noise floor in accordance with the difference between the unmodified output signal and the modified output signal.

27. (Original) The noise extraction method of claim 26 further including the steps of correcting the noise floor for errors introduced by the modifying step.

28. (Original) The noise extraction method of claim 26 wherein the small noise fluctuation amplitude is within a predetermined range.

29. (Original) The noise extraction method of claim 28 further including the step of correcting the noise floor in accordance with the unmodified output signal and the small noise fluctuation amplitude.

30. (Original) The noise extraction method of claim 29 wherein the correcting step introduces a fixed amount of correction.

31. (Original) The noise extraction method of claim 30 further including the step of modifying the correcting step with a correction convergence factor.

32. (Original) The noise extraction method of claim 31 wherein the step of modifying the correcting step introduces a variable amount of correction.

33. (Original) The noise extraction method of claim 32 further including the step of selecting the lesser of the variable amount of correction and the fixed amount of correction, and correcting the noise floor in accordance therewith.

34. (Original) The noise extraction method of claim 1 wherein the environmental input comprises a plurality of inputs.

35. (Original) The noise extraction method of claim 1 wherein the environmental input is at least one of a group comprising a microphone, an accelerometer, a tachometer, and a speedometer.

36. (Original) The noise extraction method of claim 1 wherein the group further includes inputs indicating binary state.

37. (Original) The noise extraction method of claim 36 wherein the binary state inputs include indicia for at least one of a group comprising: whether windows are open or closed, whether doors are open or closed, and whether a roof is open or closed.

38. (Original) A noise extraction method comprising the steps of:
providing a plurality of environmental inputs each of which includes indicia corresponding directly or indirectly to environmental noise,
combining a plurality of the environmental inputs into a primary environmental input,
selectively modifying the primary environmental input in accordance with an algorithm based on at least one of a group including time response, amplitude of response, and error correction, and
generating an output signal accordingly.

39. (Original) The noise extraction method of claim 38 wherein the combining step including a signal processing step.

40. (Original) The noise extraction method of claim 39 wherein the signal processing step is performed separately for each environmental input.

41. (Original) The noise extraction method of claim 40 wherein the signal processing step

includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

42. (Original) The method of claim 21 further including the step of signal processing at least one of the environmental input and the reference input.

43. (Original) The method of claim 42 wherein the signal processing step includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

44. (Original) The noise extraction method of claim 1 wherein the modifying step includes an algorithm based on time response, and the time response algorithm includes variable attack and release.

45. (Original) The noise extraction method of claim 1 wherein the algorithm includes a plurality of algorithms.

46. (Original) The noise extraction method of claim 45 wherein modifying step includes combining at least some results of the algorithms.

47. (Original) The noise extraction method of claim 45 wherein the plurality of algorithms includes a plurality of time response algorithms.

48. (Original) The noise extraction method of claim 45 wherein the plurality of algorithms includes a plurality of amplitude response algorithms.

49. (Original) The noise extraction method of claim 45 wherein the plurality of algorithms includes a plurality of error correction algorithms.

50. (Original) The noise extraction method of claim 46 wherein the combining step includes combining at least some algorithms of like kind.

51. (Original) A noise extraction method comprising the steps of:

providing a reference input indicative of output power level,

providing an environmental input which includes a noise indicia,

generating an indication of noise power level in response to the environmental input,

comparing the reference input to the indication of noise power level,

selectively modifying system gain in accordance with compare step.

52. (Original) The noise extraction method of claim 51 wherein the selectively modifying step is only performed when the indication of noise level exceeds a predetermined threshold in comparison with the reference input.

53. (Original) The noise extraction method of claim 52 further including providing a sensitivity control signal for setting the predetermined threshold.

54. (Original) The noise extraction method of claim 51 wherein the comparing step includes scaling of at least one of a group comprising the reference signal, the indication of noise power level and the environmental input.

55. (Original) The noise extraction method of claim 51 wherein the reference input includes a plurality of reference inputs each indicative of associated output power level.

56. (Original) The noise extraction method of claim 55 further including the step of combining at least some of the plurality of reference inputs to generate an overall indication of output power level.

57. (Original) The noise extraction method of claim 55 wherein the environmental input includes a plurality of environmental inputs each including an associated noise indicia.

58. (Original) The noise extraction method of claim 57 further including the step of combining at least some of the plurality of inputs to generate an overall indication of noise power level.

59. (Original) The noise extraction method of claim 25 further including the step of signal processing at least one of the environmental input and the reference input.

60. (Original) The method of claim 59 wherein the signal processing step includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

61. (Original) The method of claim 26 further including the step of signal processing at least one of the environmental input and the reference input.

62. (Original) The method of claim 61 wherein the signal processing step includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

63. (Original) The method of claim 21 wherein at least one of the steps of providing at least one environmental input and at least one reference input includes providing a plurality of such inputs.

64. (Original) The method of claim 63 wherein the determining step includes determining the difference between associated ones of the environmental inputs and the reference inputs.

65. (Original) The method of claim 64 wherein the determining step further includes signal processing of at least one of the group comprising the at least one environmental input and the at least one reference input.

66. (Original) The method of claim 64 wherein the converting step includes converting each result of the determining step.

67. (Original) The method of claim 66 further including the step of combining results of the converting step.

68. (Original) The method of claim 21 further including the step of converting the environmental input and the reference input by at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

69. (Original) The method of claim 65 wherein the signal processing includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

70. (Original) The method of claim 25 wherein at least one of the steps of providing at least one environmental input and at least one reference input includes providing a plurality of such inputs.

71. (Original) The method of claim 70 wherein the determining step includes determining the difference between associated ones of the environmental inputs and the reference inputs.

72. (Original) The method of claim 71 wherein the determining step further includes signal processing of at least one of the group comprising the at least one environmental input and the at least one reference input.

73. (Original) The method of claim 71 wherein the converting step includes converting each result of the determining step.

74. (Original) The method of claim 73 further including the step of combining results of the converting step.

75. (Original) The method of claim 72 wherein the signal processing includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

76. (Original) The method of claim 71 wherein the step of generating a modified output signal includes generating a modified output signal for at least some of the associated ones.

77. (Original) The method of claim 76 further including the steps of selecting, for at least some of the pairs of associated ones, as an unmodified output signal the one signal of the group modified in the modifying step,

determining for at least some of the pairs of associated ones the difference between the

unmodified output signal and the modified output signal,

establishing a plurality of noise floors in accordance with the differences between the associated ones of the unmodified output signal and the modified output signal.

78. (Original) The method of claim 77 wherein the determining step further includes signal processing of at least one of the group comprising the modified output signal and the unmodified output signal.

79. (Original) The method of claim 78 further including the step of combining results of the determining step.

80. (Original) The method of claim 78 wherein the signal processing includes at least one of a group comprising input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

81. (Original) The method of claim 77 further including the step of correcting the plurality of noise floors for errors introduced by the modifying step.

82. (Original) A method for automatic input calibration of systems comprising the steps of

providing a calibration signal to produce a predetermined output power level,

generating a reference signal indicative of the predetermined output power level,

providing an input power signal,

setting upper and lower thresholds bounding a selected signal of a group comprising the reference signal and the input power signal,

determining the difference between the input power signal and the reference signal,

adjusting system gain if the difference exceeds the bounding set by the upper and lower thresholds.

83. (Original) The method of claim 82 wherein the adjusting step includes decreasing the input power signal if the difference exceeds the upper threshold.

84. (Original) The method of claim 82 wherein the adjusting step includes increasing the reference signal if the difference exceeds the upper threshold.

85. (Original) The method of claim 82 wherein the adjusting step includes increasing the input power signal if the difference is less than the lower threshold.

86. (Original) The method of claim 82 wherein the adjusting step includes decreasing the reference signal if the difference is less than the lower threshold.

87. (Original) The method of claim 82 further including the step of repeating the determining and adjusting steps until the difference does not exceed the bounding set by the upper and lower thresholds.

88. (Original) The method of claim 87 wherein the step of repeating the determining and adjusting steps continues until the difference has not exceeded the bounding set by the upper and lower thresholds for a predetermined number of iterations.

89. (Original) The method of claim 81 further including the step of delaying further adjustments in system gain for a predetermined period.

90. (Original) The method of claim 81 wherein the step of determining the difference includes signal processing of the difference.

91. (Original) The method of claim 90 wherein the signal processing includes at least one of a group including input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

92. (Original) The method of claim 90 wherein the signal processing includes low pass filtering with a corner frequency that decreases over time.

93. (Original) The method of claim 92 wherein the corner frequency decreases over time to a predetermined limit.

94. (Original) The method of claim 82 wherein the step of adjusting system gain includes signal processing of at least one of the group comprising the reference signal and the input power signal.

95. (Original) The method of claim 94 wherein the signal processing includes at least one of a group including input scaling, filtering, rectification, envelope detection, averaging, RMS power estimation, Fourier transform, delay compensation, equalizing, emphasizing and de-emphasizing.

96. (Original) The method of claim 82 wherein the step of providing a calibration signal includes providing the calibration signal to a transducer.

97. (Original) The method of claim 96 wherein the transducer is selected from a group including an audio speaker and an ultrasonic transmitter.

98. (Original) The method of claim 82 wherein the step of providing an input power signal includes receiving an input signal from a transducer.

99. (Original) The method of claim 98 wherein the transducer is selected from a group including a microphone and an ultrasonic receiver.

100. (Original) The method of claim 96 wherein the transducer is an optical device.

101. (Original) The method of claim 98 wherein the transducer is an optical device.

102. (Original) The method of claim 96 wherein the transducer is a radio frequency (RF) device.

103. (Original) The method of claim 98 wherein the transducer is an RF device.

104. (Original) The method of claim 87 further including the step of computing a fine adjustment gain to further reduce the difference more closely to zero.

105. (Original) The method of claim 82 wherein the calibration signal comprises at least of a group comprising white noise, pink noise, narrow band noise, sine waves, triangular waves, square waves and sweep tones.